



~~GOLD SPOT PLATED LEADFRAMES~~

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~~FOR SEMICONDUCTOR DEVICES AND METHOD OF FABRICATION~~ #3,2001

*Semiconductor Circuit Assembly Having
A Plated Leadframe Including Gold
Selectively Covering Areas To Be
Soldered*

FIELD OF THE INVENTION

5 The present invention is related in general to the field of semiconductor devices and processes and more specifically to the materials and fabrication of leadframes for integrated circuit devices.

10 DESCRIPTION OF THE RELATED ART

The leadframe for semiconductor devices was invented (US Patents # 3,716,764 and # 4,034,027) to serve several needs of semiconductor devices and their operation
15 simultaneously: First of all, the leadframe provides a stable support pad for firmly positioning the semiconductor chip, usually an integrated circuit (IC) chip. Since the leadframe including the pads is made of electrically conductive material, the pad may be biased, when needed, to
20 any electrical potential required by the network involving the semiconductor device, especially the ground potential.

Secondly, the leadframe offers a plurality of conductive segments to bring various electrical conductors into close proximity of the chip. The remaining gap between
25 the ("inner") tip of the segments and the conductor pads on the IC surface are typically bridged by thin metallic wires, individually bonded to the IC contact pads and the leadframe segments. Obviously, the technique of wire bonding implies that reliable welds can be formed at the (inner) segment
30 tips.

WE CLAIM:

1. A leadframe for use with integrated circuit chips comprising:

5 a plated layer of gold selectively covering^{outer} areas of said leadframe intended for solder attachment~~x~~ and ~~said gold layer providing a visual distinction to said areas.~~

- 10 2. A leadframe for use with integrated circuit chips, having a chip mount pad and a plurality of lead segments, comprising:

a leadframe base made of copper or copper alloy;
a first layer of nickel deposited on said copper or copper alloy;

15 a layer of an alloy of nickel and palladium on said first nickel layer;

a second layer of nickel on said alloy layer, said second nickel layer deposited to be suitable for bending of said lead segments, wire bonding, and solder attachment;

20 a layer of palladium, said palladium layer deposited to be suitable for protecting the nickel surface for wire bonding and solderability, and for adhesion to molding compound; and

25 a layer of gold selectively covering^{outer} areas of said lead segments intended for solder attachment~~x~~ ~~said layer of gold providing a visual distinction to said areas and having a thickness to optimize solder attachment.~~

- 30 3. The leadframe according to Claim 2 wherein said gold layer has a thickness in the range from 2 to 5 nm.

4. The leadframe according to Claim 2 wherein said first nickel layer has a thickness in the range from 50 to 150